

FLASH-UP OF COSMIC GAMMA RADIATION FROM OBSERVATIONS
ABOARD AES COSMOS 461

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Translation of: "Vspyshka Kosmicheskogo γ -Izlucheniya
po Nablyudeniyam na ISZ "Kosmos-461","
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FLASH-UP OF COSMIC GAMMA RADIATION FROM OBSERVATIONS
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Measurements of the intensity of γ radiation in the 0.2-1.5 Mev range, made simultaneously on several Vela satellites, led to the detection of rare short splashes of intensity of cosmic γ rays and to a judgement of a possible direction of their origin.

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In the present work³ we are presenting data from observations of a flareup of 17 January 1972 (event 72-1, 63556 sec., earth time⁴) from the Cosmos 461 satellite, onboard which was set up a multichannel γ spectrometer with an isotropic detector installed on the end of a long rod. The effected area of the detector made of NaJ(Tl) crystal amounts to 57.5 cm².

The flareup of γ radiation intensity occurred at the period of time when the multichannel analyzer of the spectrometer was in an output function with data from an earlier measured spectrum. However, at our disposal are measurement data from the time of the flareup and two wide energy channels of this apparatus, 0.05-0.3 Mev and in the vicinity of 4 Mev, and also data from an intensitometer working in the 0.05-0.3 Mev range.

The figure represents the results of the measurement by the intensitometer. From it can be seen that the flareup appeared clearly against the overall background of diffuse cosmic γ radiation and radiation from the albedo of the earth's atmosphere, and represents a sequence of three pulses with a total

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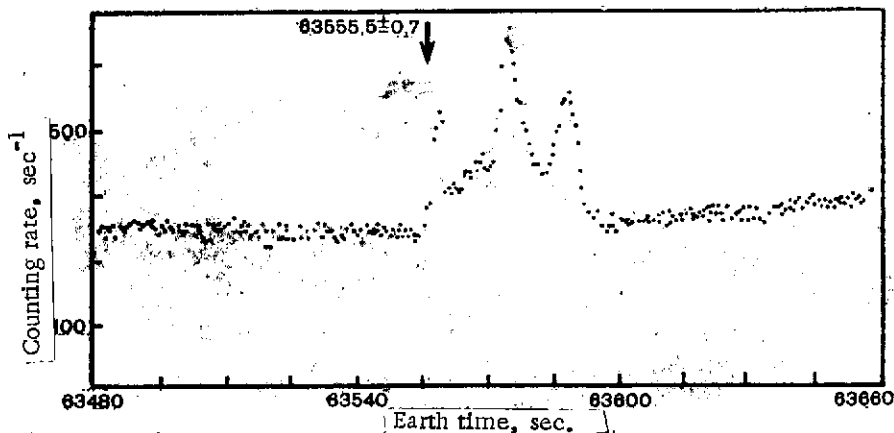
²Physical Technological Institute named for A. F. Ioffe, Academy of Sciences, USSR.

³When the article "Powerful γ Ray Splashes, a New Astronomical Discovery", published in this number, was already prepared for this issue, the editors received information about Soviet observations of this phenomenon which we are publishing with some abbreviations (this material is printed fully in Pis'mah v ZhETF, Volume 19, Issue 2, 1974).

⁴Earth time is the time at the Greenwich meridian.

*Numbers in the margin indicate pagination in the foreign text.

duration of 37 seconds. A more exact time structure of the flareup is not provided in the graph, since the full time constant of the intensitometer and of the telemetric channel was ~ 2 seconds.



Record of Intensity of γ Radiation by Apparatus on the Cosmos 461 Satellite on 17 January 1972: It is Rare to Find a γ Flareup Against the Regular Background. The arrow marks the beginning of the flareup recorded on the same day by a Vela system.

The time the flareup began (6355.5 ± 0.7 sec. earth time) closely agrees with the time of the beginning of event 72-1 mentioned above.

The whole number of detector pulses recorded in the flareup amounts to $\sim 5 \cdot 10^3$. This magnitude, with a calculation of detector efficiency, corresponds to a total energy flow in the 50-300 Kev range for the entire time of the flareup and is approximately equal to $3 \cdot 10^{-5}$ erg \cdot cm 2 .

The readings of the intensitometer and the data from the wide differential channel (0.05-0.3 Mev) in which the measurements average out after an interval of 18 seconds, completely agree. The statistically significant changes in counting rate in the 4 Mev area are not indicated. If we assume that the flash spectrum, slower to that measured by colleagues from the University of California, follows the law of exponents $\omega E_Y^{-\alpha}$ with $\alpha = 1-1.5$ and drops quickly at a photon energy of 700-800 keV, the full energy flow in the flashup can amount to $7-9 \cdot 10^{-5}$ /97
erg \cdot cm $^{-2}$.

Obviously the simultaneous recording of the flash-up on the Vela and Cosmos 461 satellites excludes the possibility that the phenomenon witnessed by us could be occasioned by local causes. At the moment of the flareup the Cosmos 461

satellite was in the segment of its orbit illuminated by the Sun in the region of -5° - 8° latitude and 4° - 5° longitude, but observations from the Vela satellites exclude the Sun as the source. In addition let us add that on the day of observation the Sun was calm and no direct temporal connection was found between the flareup and any other activity on it. was established by us.

Therefore we are apparently fully justified in speaking of a galactic or metagalactic source for the flareup.

The screening of the satellite from the Earth at the moment of measurement removed the possibility of this source being located on the celestial sphere in a circle of 68° radius with central coordinates of $\alpha \approx 205^{\circ}$ and $\delta \approx +7^{\circ}$.

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